

**Supplemental Amendment and Remarks**

Serial No.: 09/345,335

Confirmation No.: 1129

Filed: July 1, 1999

For: PROCESS VARIABLE GENERALIZED GRAPHICAL DEVICE DISPLAY AND METHODS REGARDING  
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**REMARKS**

Claim 1, 21, 40, 43, 47, and 51 have been amended. Therefore, claims 1, 3-5, 7-21, 23-25 and 27-51 are pending in the application. The amendments are being made in response to a telephone interview with the Examiner and Supervisory Patent Examiner. Reconsideration and withdrawal of the rejections are respectfully requested.

**Summary of Telephone Interview**

A telephone interview, between Mark Gebhardt and the Examiner and Supervisory Patent Examiner, was conducted on April 2, 2003. During the interview, it was noted by Mr. Gebhardt that the definition of certain terms in the claims were not being given the meaning as per the specification by the Examiner. The Examiner indicated that such language was not in the claims and therefore, could not be given any weight in interpreting the claims in view of the art. Although Applicants disagree with such an assertion, it was agreed that the claims would be amended to reflect certain definition with regard to such terms. Some exemplary language was suggested and the Examiner seemed receptive to the consideration of such language. It was concluded that a Supplemental Amendment and Response be provided prior to further examination so that such an amendment could be considered. The amendments provided herein are a result of this interview.

**Drawings**

Applicants continue to respectfully request consideration and approval of amended Figures 3 and 11, submitted with Applicants' response to the 7 November 2001 Office Action.

**Claims**

Applicants have amended certain claims to provide definition for certain terms therein. It is Applicants' position that such terms have always had the definition as presented in the now

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amended claims in view of the specification, and therefore, such amendments do not provide a narrowing effect thereon. In other words, the amendments only clarify the claims, however, the scope of the claims is intended to be the same after the amendment as it was before the amendment.

**The Rejections**

Applicants continue to respectfully traverse the rejection of the claims based on the cited references and believe that the previously filed responses overcome the Examiner's rejections, particularly in view of the amendments made to the claims. Such responses are incorporated by reference herein.

**Allowable Subject Matter**

Applicants continue to acknowledge the Examiner's indication that claims 14 and 34 are objected to as being dependent on a rejected base claim, but that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, Applicants have not rewritten the claims in independent form as Applicants continue to believe that the claims upon which they depend are also in allowable condition.

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**Summary**

It is respectfully submitted that the pending claims are in condition for allowance and notification to that effect is respectfully requested. It is requested that the Examiner contact Applicants' Representatives, at the below-listed telephone number, to discuss the prosecution of this application when it is taken up for consideration.

**Respectfully submitted for**

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21 Apr. 2003  
Date**CERTIFICATE UNDER 37 CFR §1.8:**

The undersigned hereby certifies that this paper is being transmitted by facsimile in accordance with 37 CFR §1.6(d) to the Patent and Trademark Office, addressed to Assistant Commissioner for Patents, Washington, D.C. 20231, on this

21 day of April, 2003, at 3:45pm (Central Time).

By: Sandy TruehartName: SANDY TRUEHART

**APPENDIX A - CLAIM AMENDMENTS  
INCLUDING NOTATIONS TO INDICATE CHANGES MADE**  
**Serial No.: 09/345,335**  
**Docket No.: 115.00100101**

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Amendments to the following are indicated by underlining what has been added.

**In the Claims**

Claims 1, 3-5, 7-21, 23-25 and 27-51 are pending. For convenience, all pending claims are shown below.

1. (Three Times Amended) A graphical user display for providing real-time process information to a user for a process that is operable under control of one or more process variables, wherein one or more of the process variables has high and low process limit values associated therewith, the graphical user display comprising one or more graphical devices, wherein each graphical device corresponds to a process variable, wherein at least one graphical device for a corresponding process variable comprises:

a gauge axis;

a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set and a second pair of high and low limit elements representative of the operator set high and low limit values for the corresponding process variable which define a range in which the process is free to operate, where the first and second pair of high and low limit elements are displayed on the gauge axis; and

a graphical shape displayed along the gauge axis representative of a value of the corresponding process variable relative to the process limit values.

3. The graphical user display of claim 1, wherein the at least one graphical device comprises a first pair of parallel lines extending orthogonal to the gauge axis representative of the engineering hard high and low limit values for the corresponding process variable and a second pair of parallel lines extending orthogonal to the gauge axis representative of the operator set high and low limit values for the corresponding process variable.

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4. The graphical user display of claim 3, wherein a single pair of parallel lines extending orthogonal to the gauge axis represent both the engineering hard high and low limit values and the operator set high and low limit values for the corresponding process variable when the operator set high and low limit values are set at the engineering hard high and low limit values.
  5. The graphical user display of claim 3, wherein the second pair of parallel lines extending orthogonal to the gauge axis representative of operator set high and low limit values are displayed at a shorter length than and between the first pair of parallel lines extending orthogonal to the gauge axis representative of engineering hard high and low limit values along the gauge axis.
  7. The graphical user display of claim 3, wherein the graphical shape is positioned adjacent one of the first or second pair of high and low limit elements when the value for the corresponding process variable is within a certain range of the engineering hard high and low limit values or the operator set high and low limit values.
  8. The graphical user display of claim 3, wherein the graphical shape is positioned outside of the parallel lines of the second pair of high and low limit elements when the value for the corresponding process variable is outside the operator set high and low process limit values by a predetermined percentage.
  9. The graphical user display of claim 1, wherein the graphical device further comprises a graphical symbol representative of an optimization characteristic for the corresponding process variable.

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10. The graphical user display of claim 9, wherein the graphical symbol is representative of a corresponding process variable to be maximized.
  11. The graphical user display of claim 9, wherein the graphical symbol is representative of a corresponding process variable to be minimized.
  12. The graphical user display of claim 9, wherein the graphical symbol is representative of a corresponding process variable which is to be held at a resting value.
  13. The graphical user display of claim 1, wherein the at least one graphical device further comprises a graphical symbol representative of the corresponding process variable being constrained to set point.
  14. The graphical user display of claim 1, wherein the at least one graphical device further comprises a graphical symbol representative of the corresponding process variable being wound up.
  15. The graphical user display of claim 1, wherein the graphical shape is a circle positioned along the gauge axis.
  16. The graphical user display of claim 1, wherein the graphical shape has a color of a set of colors that reflects the state of the current value for the corresponding process variables.
  17. The graphical user display of claim 16, wherein a color for the graphical shape represents one of a current value of the corresponding process variable being within the second pair of high and low limit values, the current value of the corresponding process variable being within a

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percentage of one of the second pair of high and low limit values, and the current value of the corresponding process variable being outside of the second pair of high and low limit values.

18. The graphical user display of claim 1, wherein the process is a continuous multivariable process being performed at a process plant, wherein the continuous multivariable process is operable under control of at least manipulated variables and controllable variables of the one or more process variables.

19. The graphical user display of claim 18, wherein the graphical user display comprises a matrix display having the manipulated variables displayed along a first axis thereof and the controlled variables displayed along a second axis thereof, wherin each of the manipulated and controlled variables includes a graphical device displayed in proximity thereto.

20. The graphical user display of claim 1, wherein each graphical device displayed is selectable for navigation to more detailed information for process variable corresponding to the selected graphical device, wherein the detail information is displayed on the same screen therewith.

21. (Three Times Amended) A computer implemented method for providing a graphical user display for providing real-time process information to a user for a process that is operable under control of one or more process variables, wherein one or more of the process variables has high and low process limit values associated therewith, the method comprising the step of displaying at least one graphical device for a corresponding process variable, wherein displaying the at least one graphical device comprises:

displaying a gauge axis;

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displaying a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set and a second pair of high and low elements representative of the operator set high and low limit values for the corresponding process variable on the gauge axis which define a range in which the process is free to operate; and

displaying a graphical shape along the gauge axis representative of a value of the corresponding process variable relative to the high and low process limit values.

23. The method of claim 21 , wherein displaying the first pair of high and low limit elements representative of engineering hard high and low limit values comprises displaying a first pair of parallel lines extending orthogonal to the gauge axis, and further wherein displaying the second pair of high and low limit elements representative of operator set high and low limit values comprises displaying a second pair of parallel lines extending orthogonal to the gauge axis.

24. The method of claim 21, wherein displaying at least one pair of high and low limit elements comprises displaying a single pair of parallel lines extending orthogonal to the gauge axis to represent both the engineering hard high and low limit values and the operator set high and low limit values for the corresponding process variable when the operator set high and low limit values are set at the engineering hard high and low limit values.

25. The method of claim 23, wherein the second pair of parallel lines extending orthogonal to the gauge axis representative of operator set high and low limit values are displayed at a shorter length than and between the first pair of parallel lines extending orthogonal to the gauge axis representative of engineering hard high and low limit values.

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27. The method of claim 23, wherein displaying the graphical shape along the gauge axis comprises displaying the graphical shape at position adjacent one of the first or second pair of high and low limit elements when the value for the corresponding process variable is within a certain range of one of the high and low process limit values.

28. The method of claim 23, wherein displaying the graphical shape along the gauge axis comprises displaying the graphical shape at position outside of the parallel lines when the value for the corresponding process variable is outside the second pair of high and low elements representative of operator set high and low process limit values by at least a predetermined percentage.

29. The method of claim 21, wherein the method further comprises displaying a graphical symbol representative of an optimization characteristic for the corresponding process variable along the gauge axis.

30. The method of claim 29, wherein the graphical symbol is representative of a corresponding process variable to be maximized.

31. The method of claim 29, wherein the graphical symbol is representative of a corresponding process variable to be minimized.

32. The method of claim 29, wherein the graphical symbol is representative of a corresponding process variable which is to be held at a resting value.

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33. The method of claim 21, wherein displaying the graphical shape along the gauge axis further comprises displaying a graphical symbol representative of the corresponding process variable being constrained to set point.

34. The method of claim 21, wherein displaying the graphical shape along the gauge axis further comprises displaying a graphical symbol representative of the corresponding process variable being wound up.

35. The method of claim 21, wherein displaying the graphical shape along the gauge axis comprises displaying a circle along the gauge axis.

36. The method of claim 21, wherein the method further comprises:  
determining a state of a current value for the corresponding process variable; and  
displaying the graphical shape in a color of a set of colors that reflects the determined state for the corresponding variable.

37. The method of claim 36, wherein determining the state of the current value comprises determining whether the current value of the corresponding process variable is within the second pair of high and low limit values, whether the current value of the corresponding process variable is within a certain percentage of one of the second pair of high and low limit values, and whether the current value of the corresponding process variable is outside of the second pair of high and low limit values.

38. The method of claim 21, wherein the process is a continuous multivariable process being performed at a process plant, wherein the continuous multivariable is operable under control of

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at least manipulated variables and controlled variables of the one or more process variables, and further wherein the method comprises:

displaying a matrix display having the manipulated variables displayed along a first axis thereof and the controlled variables displayed along a second axis thereof; and

displaying a graphical device in proximity to each of the manipulated variables and controlled variables.

39. The method of claim 21, wherein the method further comprises:

receiving user input to select a displayed graphical device; and

displaying detailed information for the process variable corresponding to the selected graphical device, wherein the detailed information is displayed on the same screen with the graphical device.

40. (Twice Amended) A graphical user display comprising one or more graphical devices for providing real-time process information to a user for a continuous multivariable process being performed at a process plant and operable under control of at least manipulated variables and controlled variables of a plurality of process variables, wherein the graphical user display comprises a display providing the manipulated variables and the controlled variables, and wherein one or more of the process variables comprise high and low process limit values associated therewith, wherein each of a plurality of the one or more graphical devices corresponds to a process variable, wherein each graphical device corresponding to a process variable comprises:

a gauge axis;

a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set and a second pair of high and low limit elements representative

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of the operator set high and low limit values for the corresponding process variable which define  
a range in which the process is free to operate, where the first and second pair of high and low  
limit elements are displayed on the gauge axis; and

a graphical shape displayed along the gauge axis representative of a value of the  
corresponding process variable relative to process limit values that provides real-time process  
information to a user for the process, and further wherein each of the plurality of graphical  
devices is displayed in proximity to one of the manipulated and controlled variables.

41. The graphical user display of claim 40, wherein the display providing the manipulated  
variables and controlled variables comprises a matrix display having the manipulated variables  
displayed along a first axis thereof and the controlled variables displayed along a second axis  
thereof.

42. The graphical user display of claim 40, wherein at least one graphical device displayed is  
selectable for navigation to more detail information for a process variable corresponding to the  
selected graphical device, wherein the detail information is displayed on the same screen  
therewith.

43. (Once Amended) A graphical user display for providing real-time process information to a  
user for a process that is operable under control of one or more process variables, wherein one or  
more of the process variables has high and low process limit values associated therewith, the  
graphical user display comprising one or more graphical devices, wherein each of a plurality of  
the graphical devices correspond to a process variable, wherein at least one graphical device  
corresponding to a process variable comprises:

a gauge axis;

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a first pair of high and low limit elements representative of engineering hard and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set and a second pair of high and low limit elements representative of the operator set high and low limit values for the corresponding process variable which define a range in which the process is free to operate, where the first and second pair of high and low limit elements are displayed on the gauge axis;

a graphical shape displayed along the gauge axis representative of a value of the corresponding process variable relative to the process limit values; and

a graphical symbol representative of an optimization characteristic for the corresponding process variable.

44. The graphical user display of claim 43, wherein the graphical symbol is representative of a corresponding process variable to be maximized.

45. The graphical user display of claim 43, wherein the graphical symbol is representative of a corresponding process variable to be minimized.

46. The graphical user display of claim 43, wherein the graphical symbol is representative of a corresponding process variable which is to be held at a resting value.

47. (Once Amended) A computer implemented method for providing a graphical user display for providing real-time process information to a user for a process that is operable under control of one or more process variables, wherein one or more of the process variables has high and low process limit values associated therewith, wherein the method comprises displaying a plurality of graphical devices for corresponding process variables, wherein displaying at least one of the graphical devices comprises:

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displaying a gauge axis;

displaying a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set and a second pair of high and low elements representative of the operator set high and low limit values for the corresponding process variable on the gauge axis which define a range in which the process is free to operate;

displaying a graphical shape along the gauge axis representative of a value of the corresponding process variable relative to the high and low process limit values; and

displaying a graphical symbol representative of an optimization characteristic for the corresponding process variable along the gauge axis.

48. The method of claim 47, wherein the graphical symbol is representative of a corresponding process variable to be maximized.

49. The method of claim 47, wherein the graphical symbol is representative of a corresponding process variable to be minimized.

50. The method of claim 47, wherein the graphical symbol is representative of a corresponding process variable which is to be held at a resting value.

51. (Once Amended) A computer implemented method for providing a graphical user display for providing real-time process information to a user for a continuous multivariable process being performed at a process plant, wherein the continuous multivariable process is operable under control of at least manipulated variables and controlled variables, wherein one or more of the manipulated variables and controlled variables has high and low process limit values associated therewith, wherein the method comprises displaying a matrix display having the

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manipulated variables displayed along a first axis thereof and the controlled variables displayed along a second axis thereof, and further wherein the method comprises displaying a graphical device in proximity to each of the manipulated variables and controlled variables, wherein displaying the graphical device comprises:

displaying a gauge axis;

displaying a first pair of high and low limit elements representative of engineering hard high and low limit values for the corresponding process variable that define a range in which operator set high and low limit values are set and a second pair of high and low elements representative of the operator set high and low limit values for the corresponding process variable on the gauge axis which define a range in which the process is free to operate; and

displaying a graphical shape along the gauge axis representative of a value of the corresponding process variable relative to the high and low process limit values.